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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,858	01/05/2001	Lawrence Yium-Chee Chiu	ARC920000054US1	3691

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EXAMINER

MCLEAN MAYO, KIMBERLY N

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 08/31/2004

15

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/755,858

Applicant(s)

CHIU ET AL.

Examiner

Kimberly N. McLean-Mayo

Art Unit

2187

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-12,14-20 and 22-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-12,14-20 and 22-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/21/2002.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2187

DETAILED ACTION

1. In view of the Appeal Brief filed on April 13, 2004, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 4, 7, 9, 12, 15, 17, 20 and 23 rejected under 35 U.S.C. 103(a) as being unpatentable over Menon et al. (USPN: 5,574,882) in view of Schimmel, UNIX Systems for Modern Architectures Symmetric Multiprocessing and Caching for Kernel Programmers.

Regarding claims 1, 4, 17 and 20, Menon discloses a method of updating parity data in a RAID clustered environment comprising locking parity data, without communicating

Art Unit: 2187

with other nodes, for data managed in SCSI (small computer system interface) disks in a RAID clustered system (Figure 1; C 4, L 42; C 4, L 36; C 6, L 1-46), wherein locking prevents other nodes from modifying the parity (C 6, L 24-26); reading the parity data (C 6, L 27-28); generating new parity data by exclusive oring data from a first node and a second node (C 6, L 29-30); writing the parity data to a SCSI disk in the RAID system (C 6, L 31-44) and unlocking the parity wherein the unlocking and the writing steps are combined (C 6, L 45-46). Menon does not explicitly disclose combining the commands for writing and unlocking into a single command. However, Schimmel teaches the concept of combining commands (read command, write command, modify command) into a single command (read-modify-write instruction –Page 158-160; Section 8.3.3). This feature taught by Schimmel provides accuracy and efficiency by allowing separate sequential operations to be performed uninterrupted (atomically) and without having to re-obtain access of the bus for each separate command function by using a special instruction which combines three separate commands into one. Additionally, this feature provides efficiency and reduces command processing time since any delays associated with receiving the commands separately is omitted (there is no wait time to receive the next command, commands are combined and sent together) and since the device responsible for sending the commands is relieved of sending so many commands given that plural commands are sent at the same time by combining the commands, thereby allowing the device to perform other tasks. Hence, one of ordinary skill in the art would have recognized the benefits of Schimmel's teachings and would have been motivated to use these teachings with the teachings of Menon for the desirable purpose of efficiency, reduced command processing time and accuracy.

Additionally, with respect to claim 17, Menon discloses an article of manufacture, embodying logic to perform the above method steps of updating parity data in a RAID clustered environment (C 19, L 42-55; C 20, L 1-26).

Regarding claims 7 and 23, Menon discloses a RAID 5 system (C 2, L 48-51).

Regarding claims 9 and 12, Menon discloses an apparatus (Figure 1) for updating parity data in a RAID clustered environment comprising a plurality of SCSI storage devices in a RAID clustered system (Figure 1, Reference 20); data stored in the plurality of SCSI storage devices (inherent); a first node, (host), operatively coupled to the SCSI storage devices, that manages storage and retrieval of the data in the data storage devices, wherein the first node is configured to lock parity data, without communicating with other nodes, wherein locking prevents other nodes from modifying the parity (C 6, L 24-26); reading the parity data (C 6, L 27-28); generating new parity data by exclusive oring data from a first node (new data from host) and a second node (old data stored in the storage device) (C 6, L 29-30); writing the parity data to a SCSI disk in the RAID system (C 6, L 31-44) and unlocking the parity (C 6, L 45-46). Menon does not explicitly disclose combining the commands for writing and unlocking into a single command. However, Schimmel teaches the concept of combining commands (read command, write command, modify command) into a single command (read-modify-write instruction – Page 158-160; Section 8.3.3). This feature taught by Schimmel provides accuracy and efficiency by allowing separate sequential operations to be performed uninterrupted

Art Unit: 2187

(atomically) and without having to re-obtain access of the bus for each separate command function by using a special instruction which combines three separate commands into one. Additionally, this feature provides efficiency and reduces command processing time since any delays associated with receiving the commands separately is omitted (there is no wait time to receive the next command, commands are combined and sent together) and since the device responsible for sending the commands is relieved of sending so many commands given that plural commands are sent at the same time by combining the commands, thereby allowing the device to perform other tasks. Hence, one of ordinary skill in the art would have recognized the benefits of Schimmel's teachings and would have been motivated to use these teachings with the teachings of Menon for the desirable purpose of efficiency, reduced command processing time and accuracy.

Claim 15 is rejected for the same rationale applied to claim 7 above.

4. Claims 6, 14 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Menon et al. (USPN: 5,574,882) in view of Schimmel, UNIX Systems for Modern Architectures Symmetric Multiprocessing and Caching for Kernel Programmers.

as applied to claims 1, 9 and 17 above and further in view of IBM Technical Disclosure Bulletin "Limited Distributed DASD Checksum".

Menon and Schimmel disclose the limitations cited above in claims 1, 9 and 17, however, Menon and Schimmel do not disclose a RAID 4 system. The IBM Technical Disclosure Bulletin discloses a RAID 4 system (Figure 1). Additionally, the IBM Technical Disclosure Bulletin discloses that adding or removing units to a RAID 4 system is

Art Unit: 2187

relatively simple because the change does not affect the other units (Lines 14-16).

Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a RAID 4 system in the system taught by Menon and Schimmel for the desirable purpose of simplification (providing a simpler means for adding or removing units to the RAID system).

5. Claims 8, 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over in Menon et al. (USPN: 5,574,882) in view of Schimmel, UNIX Systems for Modern Architectures Symmetric Multiprocessing and Caching for Kernel Programmers, as applied to claims 1, 9 and 17 above and further in view of Lyons (USPN: 6,101,615). Menon and Schimmel disclose the limitations cited above in claims 1, 9 and 17, however, Menon and Schimmel do not disclose a RAID 6 system. Lyons discloses a RAID 6 system (Figure 5). Lyons discloses that a RAID 6 system provides improved data protection by providing two parity drives (C 1, L 49-50). Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a RAID 6 system in the system taught by Menon and Schimmel for the desirable purpose of increased data protection and reliability.

6. Claims 2-3, 10-11 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Menon in view of (USPN: 5,574,882) and Schimmel, UNIX Systems for Modern Architectures Symmetric Multiprocessing and Caching for Kernel Programmers as applied to claims 1, 9 and 17 above and further in view of Ofer (USPN: 5,892,955).

Art Unit: 2187

Menon and Schimmel disclose the limitations cited above in claims 1, 9 and 17, however, Menon and Schimmel do not explicitly disclose the locking step comprising issuing a RESERVE command nor the unlocking step comprising issuing a RELEASE command. Ofer teaches that the standard SCSI RESERVE command is used to reserve/lock data storage (C 1, L 27-30). Also, Ofer discloses a SCSI system wherein the SCSI RELEASE command is used to unlock the locked storage system. The system taught by Menon and Schimmel is a SCSI storage system, which means the system has a RESERVE and a RELEASE command. Hence, it would be obvious to use the RESERVE command to lock the parity and to use the RELEASE command to perform the unlocking for the desirable purpose of simplification and efficiency. Using an already existing command, prevents the need to develop new designs and/or implementations to perform the locking and unlocking functionality. Therefore, it would have been obvious to one of ordinary skill in the art to use the RESERVE command to lock parity and to use the RELEASE command to unlock parity for the desirable purpose of efficiency and simplification.

Response to Arguments

7. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

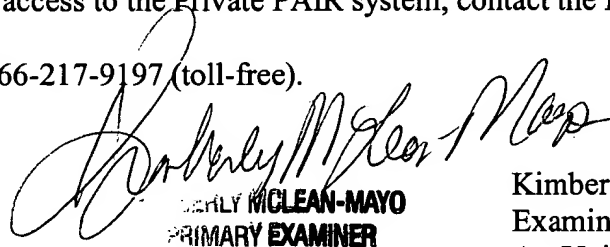
Islam – 5,530,948 – RAID systems using read-modify-write commands.

Art Unit: 2187

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly N. McLean-Mayo whose telephone number is 703-308-9592. The examiner can normally be reached on M (10:00 - 6:30); Tues, Thr (10:00 - 4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 703-308-1756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KIMBERLY MCLEAN-MAYO
PRIMARY EXAMINER

Kimberly N. McLean-Mayo
Examiner
Art Unit 2187

KNM

August 21, 2004